October 6, 1959

Dear Mr. Tassi:

Thank you for your letter and manuscript.

I think you are quite right that many astronomers have shown a singular lack of imagination when their studies approach biochemistry. However there is good reason for this: our experimental data from astronomical objects are so limited that it does leave room for almost endless speculation, and to avoid this many astronomers prefer to limit their thinking to what can be more definitely proven.

However, I think you will be pleased to know that "Jovian Biochemistry" has been taken quite seriously by some groups of astronomers and biologists who are working together to help formulate experimental programs in spaceflight research. From what I have been able to learn, the temperature profile with depth on Jupiter is quite uncertain; furthermore, a graduate student in astronomy at the Yerkes Observatory has been doing his Ph.D. thesis on a model of Jupiter whereby organic polymers are formed by the action of solar ultraviolet light on the top of the Jovian atmosphere, and these heavier particles then sediment. What then lies at the bottom of the Jovian oceans? The point of the possible occurrence of liquid water at subsurface layers has also been considered.

A Russian astronomer, Tikhov, has claimed that the CH_4 in the Jovian atmosphere should be explained as due to the action of methane-producing microorganisms. I feel we need hardly be obliged to accept this hypothesis. There is no doubt, however, that Jupiter will be of extraordinary interest as a model for at least the early stages of the evolution of planetary life.

Even looking ahead a few years, Jupiter's great mass poses very serious problems for the intended approach of a space probe. When this does eventually become possible (and we will know much about Mars and Venus before then) I am confident that the question of the existence of some form of life there will be one of the principal aims of the mission.

Yours sincerely,

Joshua Lederberg
Professor of Genetics

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